

Tick-Related Illnesses



Amblyomma americanum (lone star) female, male, nymph
Thanks to J. Occi



Ixodes Scapularis (deer tick) and poppy seeds female, male nymphs (3)
Thanks to J. Occi

While tick related illness are concerns in most environments, the specific disease can depend on the type of tick encountered and the part of the country .

Lyme disease

The Lyme disease bacterium, [*Borrelia burgdorferi*](#), normally lives in mice, squirrels and other small animals. It is transmitted among these animals—and to humans—through the bites of certain species of ticks.

In the northeastern and north-central United States, the blacklegged tick (or deer tick, *Ixodes scapularis*) transmits Lyme disease. In the Pacific coastal United States, the disease is spread by the western blacklegged tick (*Ixodes pacificus*). Other tick species found in the United States have not been shown to transmit *Borrelia burgdorferi*. Blacklegged ticks live for two years and have three feeding stages: larvae, nymph, and adult. When a young tick feeds on an infected animal, the tick takes the bacterium into its body along with the blood meal.

The bacterium then lives in the gut of the tick. If the tick feeds again, it can transmit the bacterium to its new host. Usually the new host is another small rodent, but sometimes the new host is a human.

Most cases of human illness occur in the late spring and summer when the tiny nymphs are most active and human outdoor activity is greatest.

Although adult ticks often feed on deer, these animals do not become infected. Deer are nevertheless important in transporting ticks and maintaining tick populations.

Lyme Disease Symptoms

The Lyme disease bacterium can infect several parts of the body, producing different symptoms at different times. Not all patients with Lyme disease will have all symptoms, and many of the symptoms can occur with other diseases as well. If you believe you

may have Lyme disease, it is important that you consult your health care provider for proper diagnosis.

The first sign of infection is usually a circular rash called [erythema migrans](#) or EM. This rash occurs in approximately 70-80% of infected persons and begins at the site of a tick bite after a delay of 3-30 days. A distinctive feature of the rash is that it gradually expands over a period of several days, reaching up to 12 inches (30 cm) across. The center of the rash may clear as it enlarges, resulting in a bull's-eye appearance. It may be warm but is not usually painful. Some patients develop additional EM lesions in other areas of the body after several days. Patients also experience symptoms of fatigue, chills, fever, headache, and muscle and joint aches, and swollen lymph nodes. In some cases, these may be the only symptoms of infection.

Untreated, the infection may spread to other parts of the body within a few days to weeks, producing an array of discrete symptoms. These include loss of muscle tone on one or both sides of the face (called facial or "Bell's palsy), severe headaches and neck stiffness due to meningitis, shooting pains that may interfere with sleep, heart palpitations, and dizziness due to changes in heartbeat, and pain that moves from joint to joint. Many of these symptoms will resolve, even without treatment.

After several months, approximately 60% of patients with untreated infection will begin to have intermittent bouts of arthritis, with severe joint pain and swelling. Large joints are most often effected, particularly the knees. In addition, up to 5% of untreated patients may develop chronic neurological complaints months to years after infection. These include shooting pains, numbness or tingling in the hands or feet, and problems with concentration and short term memory.

Most cases of Lyme disease can be cured with antibiotics, especially if [treatment](#) is begun early in the course of illness. However, a small percentage of patients with Lyme disease have symptoms that last months to years after treatment with antibiotics. These symptoms can include muscle and joint pains, arthritis, cognitive defects, sleep disturbance, or fatigue. The cause of these symptoms is not known. There is some evidence that they result from an autoimmune response, in which a person's immune system continues to respond even after the infection has been cleared.

Rocky Mountain spotted fever

Rocky Mountain spotted fever was first recognized in 1896 in the Snake River Valley of Idaho and was originally called "black measles" because of the characteristic rash. It was a dreaded and frequently fatal disease that affected hundreds of people in this area. By the early 1900s, the recognized geographic distribution of this disease grew to encompass parts of the United States as far north as Washington and Montana and as far south as California, Arizona, and New Mexico.

Howard T. Ricketts was the first to establish the identity of the infectious organism that causes this disease. He and others characterized the basic epidemiologic features of

the disease, including the role of tick vectors. Their studies found that Rocky Mountain spotted fever is caused by the bacterium, *Rickettsia rickettsii*. This species is maintained in nature in a complex life cycle involving ticks and mammals; humans are considered to be accidental hosts and are not involved in the natural transmission cycle of this pathogen.

The name Rocky Mountain spotted fever is somewhat of a misnomer. Beginning in the 1930s, it became clear that this disease occurred in many areas of the United States other than the Rocky Mountain region. It is now recognized that this disease is broadly distributed throughout the continental United States, as well as southern Canada, Central America, Mexico, and parts of South America. Between 1981 and 1996, this disease was reported from every U.S. state except Hawaii, Vermont, Maine, and Alaska.

The organism that causes Rocky Mountain spotted fever is transmitted by the bite of an infected tick. The American dog tick (*Dermacentor variabilis*) and Rocky Mountain wood tick (*Dermacentor andersoni*) are the primary arthropods (vectors) which transmit Rocky Mountain spotted fever bacteria in the United States. The brown dog tick *Rhipicephalus sanguineus* has also been implicated as a vector as well as the tick *Amblyomma cajennense* in countries south of the United States.

Rocky Mountain spotted fever remains a serious and potentially life-threatening infectious disease today. Despite the availability of effective treatment and advances in medical care, approximately 3% to 5% of individuals who become ill with Rocky Mountain spotted fever still die from the infection. However, effective antibiotic therapy has dramatically reduced the number of deaths caused by Rocky Mountain spotted fever; before the discovery of tetracycline and chloramphenicol in the late 1940s, as many as 30% of persons infected with *R*

Signs and Symptoms

Rocky Mountain spotted fever can be very difficult to diagnose in its early stages, even by experienced physicians who are familiar with the disease.

Patients infected with *R. rickettsii* generally visit a physician in the first week of their illness, following an incubation period of about 5-10 days after a tick bite. The early clinical presentation of Rocky Mountain spotted fever is nonspecific and may resemble a variety of other infectious and non-infectious diseases.

The classic triad of findings for this disease are fever, rash, and history of tick bite. However, this combination is not always detected when the patient initially presents for care.

Initial Signs and Symptoms

Initial symptoms may include fever, nausea, vomiting, severe headache, muscle pain, lack of appetite.

The rash first appears 2-5 days after the onset of fever and is often not present or may be very subtle when the patient is initially seen by a physician. Younger patients usually develop the rash earlier than older patients. Most often it begins as small, flat, pink, non-itchy spots (macules) on the wrists, forearms, and ankles. These spots turn pale when pressure is applied and eventually become raised on the skin.

Later Signs and Symptoms

Later signs and symptoms include rash, abdominal pain, joint pain, diarrhea.

The characteristic red, spotted (petechial) rash of Rocky Mountain spotted fever is usually not seen until the sixth day or later after onset of symptoms, and this type of rash occurs in only 35% to 60% of patients with Rocky Mountain spotted fever. The rash involves the palms or soles in as many as 50% to 80% of patients; however, this distribution may not occur until later in the course of the disease. As many as 10% to 15% of patients may never develop a rash.

Southern Tick-Associated Rash Illness

A rash similar to the rash of Lyme disease has been described in humans residing in southeastern and south-central states and is associated with the bite of the lone star tick, Amblyomma americanum. This Lyme disease-like rash has been named Southern tick-associated rash illness (STARI).

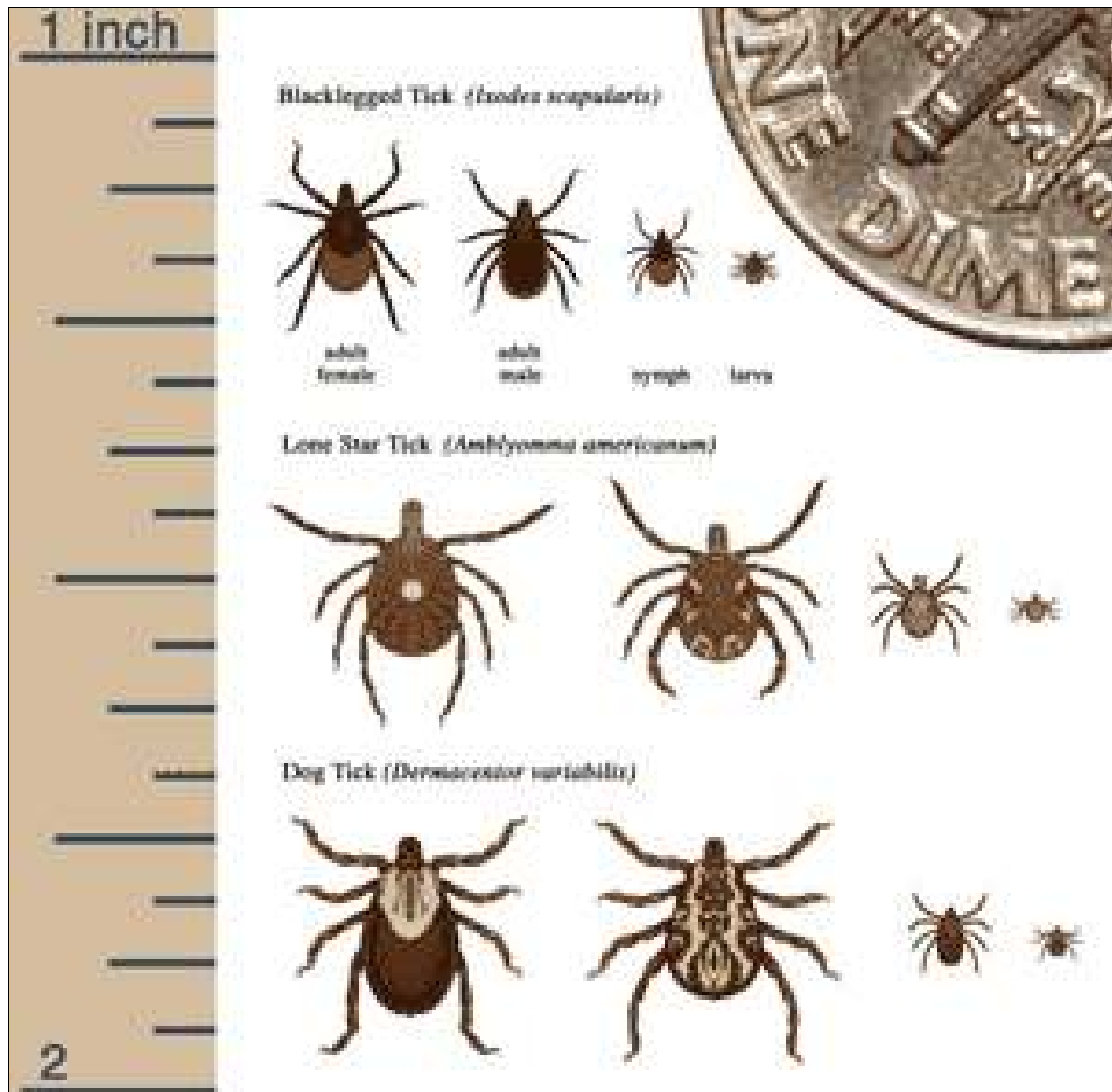
Amblyomma americanum ticks are found through the southeast and south-central states. Their life cycle and ecologic requirements are similar to Ixodes ticks with minor exceptions not described here. All three life stages of A. americanum aggressively bite people in the southern U.S. Research indicates that live spirochetes are observed in only 1-3% of A. americanum.

Even though spirochetes have been seen in A. americanum ticks by microscopy, attempts to culture it in the laboratory have consistently failed. Modified BSK (Barbour-Stoenner-Kelly) is the best medium for cultivating the Lyme disease spirochete, B. burgdorferi, but is apparently not suitable for cultivating the spirochete found in A. americanum. However, a spirochete has been detected in A. americanum by DNA analysis and was given the name *Borrelia lonestari*.

Symptoms

Persons living or traveling in southeast or southcentral states who develop a red, expanding rash with central clearing (the rash of Lyme disease, erythema migrans) following the bite of the lone star tick, A. americanum, should see their physician. The

Centers for Disease Control and Prevention is interested in obtaining samples from such patients under an Institutional Review Board-approved investigational protocol.



Workers will take the following precautionary practices:

Cover their bodies as much as possible, by wearing long pants and long-sleeved shirts. Light color clothing makes spotting ticks much easier.

Try to eliminate possible paths by which the lone star tick may reach unprotected skin. For example, tuck bottoms of pants into socks or boots and sleeves into gloves. Duct tape may be used to help seal cuffs and ankles. If heavy concentrations of ticks or other insects are anticipated or encountered, Tyvek[®] coveralls may be used for added protection.

Conduct periodic and frequent (e.g., hourly) surveys of clothing for the presence of ticks. Remove any ticks and insects that become attached to clothing.

Use insect and tick repellents that contain the chemical n,n-diethyltoluamide (DEET). Apply repellents in accordance with manufacturers' recommendations. These repellents are readily available and include such brands as Deep Woods OFF[®] and Maximum Strength OFF[®]. Check the ingredients of the repellent since the higher the concentration of DEET, the longer the effectiveness of the repellent.

If a tick is detected on an individual, but not attached, it will be removed immediately.

If an attached tick is detected on an individual's skin, it will be quickly and carefully removed. Remove the tick with a pair of fine-point tweezers. Grasp the tick by the head or mouthparts exactly where they enter the skin. Without jerking or twisting, pull firmly and steadily directly upward. Tick removal will take time, so be patient. Avoid touching the tick with bare fingers—use a tissue or glove to prevent disease transfer. Clean the bite with soap and water. Watch for signs of illness such as a skin rash, fever, and flu-like symptoms. See a health care provider if these develop.

Spiders



Black Widow



Brown Recluse

Black Widow Spider

Susan C. Jones, Ph.D.

Assistant Professor of Entomology

Extension Specialist, Household & Structural Pests * Ohio State University Extension

Species in the genus *Latrodectus* are commonly known as widow spiders. A number of different species of widow spiders occur in the United States. The black widow spider (*L. mactans*) and the northern black widow spider (*L. variolus*) occur in Ohio, although both are relatively

uncommon, especially in the northern half of the state. Other species of widow spiders occasionally arrive in shipments of household goods.

The black widow spider has a potent neurotoxic venom and is considered the most venomous spider in North America. However, the female injects such a small dose of venom that it rarely causes death. Reports indicate human mortality at well less than 1% from black widow spider bites.

Identification

The adult female black widow spider has a shiny, jet black, spherical abdomen with two connected red triangles on the underside that form a characteristic hourglass marking. Note, however, that the hourglass color may range from yellowish to various shades of orange or red. Adult females are about 1/2-inch long, not including the legs (about 1-1/2 inches when legs are spread). Adult males are harmless, about half the female's size, with smaller bodies and longer legs. The male's abdomen usually has red spots along the upper midline and white lines or bars radiating out to the sides. Newly hatched spiderlings are predominately white or yellowish-white, gradually acquiring more black and varying amounts of red and white with each molt. Juveniles of both sexes resemble the male and are harmless.

Adult female northern black widow spiders are shiny black or brown-black with a row of red spots on the top of the abdomen along the midline. Two reddish triangles resembling a split hourglass are present on the underside of the abdomen.

Life Cycle and Habits

Mating takes place in spring or summer. A common misconception is that the female usually consumes the male after mating. Such behavior rarely occurs. The female lays eggs in a silken sac that is globular shaped and about 1/3 to 1/2-inch diameter. Sacs are white at first, later turning tan or gray. Each sac contains 25 to 250 eggs, and several egg sacs may be produced over the course of a summer. The egg sacs are suspended in the web and guarded by the female. The egg incubation period usually lasts about 4 weeks. The spiderlings hatch and molt (shed their skin) one time while inside the egg sac. They then disperse by ballooning—extruding silk threads and being transported by air currents. Their growth to maturity requires 2 to 4 months depending on the availability of prey. Spiderlings molt several times before reaching maturity.

The black widow spider is a cobweb builder whose silk is very strong. The female constructs a web of crisscrossed silk threads with no recognizable pattern and with a dense area of silk, usually to one side, that serves as the spider's daytime retreat. At night, the female hangs belly upward in the center of the web. She does not leave her hidden web voluntarily. The web typically is situated near the ground in a dark, sheltered site. Webs often are one foot in diameter.

The web serves to trap the spider's food, which includes a variety of insects (cockroaches and beetles) and other arthropods. Outdoors, black widow spider webs are usually built in woodpiles, rubble piles, under stones, in hollow stumps, and in rodent burrows. These spiders commonly

occur in outbuildings such as privies, sheds, and garages. Indoors, they prefer undisturbed, cluttered areas in basements and crawl spaces.

The northern black widow spider is similar to the black widow except its habitat is marginal land with sparse vegetation. It is found in stumps, hollow logs, and piles of debris, and only rarely indoors.

Bite Symptoms

The severity of an individual's reaction to the black widow spider bite depends on the area of the body bitten, amount of venom injected, and their sensitivity to the venom. The venom travels in the bloodstream throughout the body and acts on the nervous system, causing varying degrees of pain. Some people report very intense pain. There typically is no necrosis (sloughing) of tissues and no conspicuous swelling.

The bite of a black widow spider initially may go unnoticed, but some people report a short stabbing pain. At first, there may be slight local swelling and two faint red spots, which are puncture points from the fangs. Pain soon begins and usually progresses from the bite site to finally localize in the abdomen and back. Severe cramping or rigidity may occur in the abdominal muscles. Other symptoms may include nausea, profuse perspiration, tremors, labored breathing, restlessness, increased blood pressure, and fever. Symptoms often diminish after a day or so and cease after several days. Serious long-term complications or death are very rare.

First Aid

If bitten, remain calm, and immediately seek medical attention (contact your physician, hospital and/or poison control center). Apply an ice pack directly to the bite area to relieve swelling and pain. Collect the spider (even a mangled specimen has diagnostic value), if possible, for positive identification by a spider expert. A plastic bag, small jar, or pill vial is useful and no preservative is necessary, but rubbing alcohol helps to preserve the spider.

A hospital stay may be recommended, particularly for those with a heart condition or with health problems. A physician may administer a specific antivenin to counteract the venom or calcium gluconate to relieve pain.

Control

Control efforts should target black widow spider webs because that is where the spider spends most of its time. Control is best achieved by following an integrated pest management (IPM) strategy, which involves using multiple approaches such as preventive measures, exclusion, sanitation, and chemical treatment when necessary. IPM requires a thorough inspection of the building to locate the pest. An inspection preferably should be done at night because the black widow spider is nocturnal.

Preventing Spider Bites

In order to prevent spider bites, be sure to wear gloves and a long-sleeved shirt when handling stored cardboard boxes, firewood, lumber, and rocks. Be sure to inspect these clothing items for spiders before putting them on. Shake out clothing and shoes before getting dressed.

Exclusion

Install tight-fitting screens on doors and windows to prevent entry of black widow spiders. Also install door sweeps. Seal or caulk cracks and crevices where spiders can enter the house. Install yellow or sodium vapor light bulbs outdoors since these attract fewer insects for spiders to feed upon.

Sanitation

In order to reduce black widow spider populations, it is very important to eliminate their potential hiding places indoors and outdoors. Black widow spiders are often found in undisturbed, cluttered areas indoors, so discard old boxes, old clothing, lumber, and other unwanted items in basements, crawl spaces, garages, and outbuildings. In such areas, store any items off the floor and away from walls. Remove piles of lumber and rubble outdoors. Remove ivy and other heavy vegetation from the foundation. Do not store firewood against the house. Note that these measures also reduce harborages for the spiders' prey.

Vacuum thoroughly indoors to remove black widow spiders and their webs and egg sacs. After vacuuming, immediately place the vacuum cleaner bag in a plastic bag, seal tightly, and discard in a container outdoors—this prevents captured spiders from escaping into the home. Wash off the outside of the house using a high-pressure hose, paying particular attention to window wells and other undisturbed areas where webs are built.

Insecticides

There are many labeled pesticides for spider control. Some are labeled for homeowner use, while others are labeled only for the licensed, certified pesticide applicator.

Insecticide treatments should be applied so that the chemical contacts spiders in their webs. A non-repellent insecticidal dust is useful to treat webs because the dust clings to the silk and is likely to be contacted by the spider. Individual exposed spiders can be killed with a non-residual aerosol spray, but any egg sacs will be unaffected.

A wettable powder or microencapsulated formulation of a residual insecticide can be applied to corners, behind and under furniture, behind stored items, etc. to prevent establishment of new spiders.

Residual liquid sprays applied to the outside perimeter of the home are not very effective because of the black widow spider's web-sitting behavior.

Brown Recluse Spider

Susan C. Jones, Ph.D.

Assistant Professor of Entomology* Ohio State University Extension
Extension Specialist, Household & Structural Pests

The brown recluse spider is uncommon in Ohio. Nonetheless, OSU Extension receives numerous spider specimens that homeowners mistakenly suspect to be the brown recluse. Media attention and public fear contribute to these misdiagnoses.

The brown recluse belongs to a group of spiders that is officially known as the "recluse spiders" in the genus *Loxosceles* (pronounced lox-sos-a-leez). These spiders are also commonly referred to as "fiddleback" spiders or "violin" spiders because of the violin-shaped marking on the top surface of the cephalothorax (fused head and thorax). However, this feature can be very faint depending on the species of recluse spider, particularly those in the southwestern U.S., or how recently the spider has molted.

The common name, brown recluse spider, pertains to only one species, *Loxosceles reclusa*. The name refers to its color and habits. It is a reclusive creature that seeks and prefers seclusion.

Distribution

The brown recluse spider and ten additional species of *Loxosceles* are native to the United States. In addition, a few non-native species have become established in limited areas of the country. The brown recluse spider is found mainly in the central Midwestern states southward to the Gulf of Mexico (see map). Isolated cases in Ohio are likely attributable to this spider occasionally being transported in materials from other states. Although uncommon, there are more confirmed reports of *Loxosceles rufescens* (Mediterranean recluse) than the brown recluse in Ohio. It, too, is a human-associated species with similar habits and probably similar venom risks (unverified).

Identification

In the mature brown recluse spider as well as some other species of recluse spiders, the dark violin marking is well defined, with the neck of the violin pointing toward the bulbous abdomen. The abdomen is uniformly colored, although the coloration can range from light tan to dark brown, and is covered with numerous fine hairs that provide a velvety appearance. The long, thin, brown legs also are covered with fine hairs, but not spines. Adult brown recluse spiders have a leg span about the size of a quarter. Their body is about 3/8 inches long and about 3/16 inches wide. Males are slightly smaller in body length than females, but males have proportionally longer legs. Both sexes are venomous. The immature stages closely resemble the adults except for size and a slightly lighter color. Whereas most spiders have eight eyes, recluse spiders have six eyes that are arranged in pairs in a semicircle on the forepart of the cephalothorax (see close-up view). A 10X hand lens or microscope is needed to see this diagnostic feature. In order to determine the exact species of *Loxosceles*, the spider's genitalia need to be examined under a high-power microscope. This requires the skills of a spider expert.

Life Cycle and Habits

Egg laying primarily occurs from May through July. The female lays about 50 eggs that are encased in an off-white silken sac that is about 2/3-inch diameter. Each female may produce several egg sacs over a period of several months. Spiderlings emerge from the egg sac in about a month or less. Their development is slow and is influenced by weather conditions and food availability. It takes an average of one year to reach the adult stage from time of egg deposit. Adult brown recluse spiders often live about one to two years. They can survive long periods of time (about 6 months) without food or water.

The brown recluse spider spins a loose, irregular web of very sticky, off-white to grayish threads. This web serves as the spider's daytime retreat, and it often is constructed in an undisturbed corner. This spider roams at night searching for insect prey. Recent research at the University of Kansas indicates that the brown recluse spider is largely a scavenger, preferring dead insects. Mature males also roam in search of females.

Brown recluse spiders generally occupy dark, undisturbed sites, and they can occur indoors or outdoors. In favorable habitats, their populations are usually dense. They thrive in human-altered environments. Indoors, they may be found in attics, basements, crawl spaces, cellars, closets, and ductwork or registers. They may seek shelter in storage boxes, shoes, clothing, folded linens, and behind furniture. They also may be found in outbuildings such as barns, storage sheds, and garages. Outdoors, brown recluse spiders may be found underneath logs, loose stones in rock piles, and stacks of lumber.

The brown recluse spider is not aggressive, and it normally bites only when crushed, handled or disturbed. Some people have been bitten in bed after inadvertently rolling over onto the spider. Others have been bitten after accidentally touching the spider when cleaning storage areas. Some bites occur when people put on seldom used clothing or shoes inhabited by a brown recluse.

Bite Symptoms

The physical reaction to a brown recluse spider bite depends on the amount of venom injected and an individual's sensitivity to it. Some people are unaffected by a bite, whereas others experience immediate or delayed effects as the venom kills the tissues (necrosis) at the site of the bite. Many brown recluse bites cause just a little red mark that heals without event. The vast majority of brown recluse bites heal without severe scarring (<http://spiders.ucr.edu/avoidbites.html>).

Initially, the bite may feel like a pinprick or go unnoticed. Some may not be aware of the bite for 2 to 8 hours. Others feel a stinging sensation followed by intense pain. Infrequently, some victims experience general systemic reactions that may include restlessness, generalized itching, fever, chills, nausea, vomiting, or shock. A small white blister usually initially rises at the bite site surrounded by a swollen area. The affected area enlarges and becomes red, and the tissue is hard to the touch for some time. The lesion from a brown recluse spider bite is a dry, blue-gray or blue-white, irregular sinking patch with ragged edges and surrounding redness--termed the "red, white, and blue sign." The lesion usually is 1½ inches by 2¾ inches or smaller. Characteristics of a bite are further discussed at <http://www.amednews.com/free/hlsa0805>.

The bite of the brown recluse spider can result in a painful, deep wound that takes a long time to heal. Fatalities are extremely rare, but bites are most dangerous to young children, the elderly, and those in poor physical condition. When there is a severe reaction to the bite, the site can erupt into a "volcano lesion" (a hole in the flesh due to damaged, gangrenous tissue). The open wound may range from the size of an adult's thumbnail to the span of a hand. The dead tissue gradually sloughs away, exposing underlying tissues. The sunken, ulcerating sore may heal slowly up to 6 to 8 weeks. Full recovery may take several months and scarring may remain.

It is difficult for a physician to accurately diagnose a "brown recluse bite" based simply on wound characteristics. It is absolutely necessary to have the spider for a positive identification. Necrotic wounds can result from a variety of agents such as bacteria (Staphylococcus, "flesh-eating" Streptococcus, etc.), viruses, fungi, and arthropods (non-recluse spiders, centipedes, mites, ticks, wasps, bedbugs, kissing bugs, biting flies, etc.). Necrotic conditions also can be caused by vascular and lymphatic disorders, drug reactions, underlying diseases states, and a variety of other agents. An annotated list of conditions that could be mistaken for a brown recluse spider bite is available at <http://www.ama-assn.org/amednews/2002/08/05/hlsa0805.htm>. Misdiagnosis of lesions as brown recluse bites can delay appropriate care.

First Aid

If bitten, remain calm, and immediately seek medical attention (contact your physician, hospital and/or poison control center). Apply an ice pack directly to the bite area to relieve swelling and pain. Collect the spider (even a mangled specimen has diagnostic value), if possible, for positive identification by a spider expert. A plastic bag, small jar, or pill vial is useful and no preservative is necessary, but rubbing alcohol helps to preserve the spider.

An effective commercial antivenin is not available. The surgical removal of tissue was once standard procedure, but now this is thought to slow down wound healing. Some physicians administer high doses of cortisone-type hormones to combat hemolysis and other systemic complications. Treatment with oral dapsone (an antibiotic used mainly for leprosy) has been suggested to reduce the degree of tissue damage. However, an effective therapy has not yet been found in controlled studies.

Control

Control of indoor infestations of the brown recluse spider can take a long time (6 months or more) and can be difficult because humans have a very low tolerance for this pest, it tends to be widely dispersed within infested buildings, and it seeks secluded sites. Control of spiders, including the brown recluse, is best achieved by following an integrated pest management (IPM) approach. IPM involves using multiple approaches such as preventive measures, exclusion, sanitation, trapping, and chemical treatment when necessary.

Preventing spider bites

- Shake out clothing and shoes before getting dressed.
- Inspect bedding and towels before use.

- Wear gloves when handling firewood, lumber, and rocks (be sure to inspect the gloves for spiders before putting them on).
- Remove bedskirts and storage boxes from underneath beds. Move the bed away from the wall.
- Exercise care when handling cardboard boxes (recluse spiders often are found in the space under folded cardboard flaps).

Exclusion

- Install tight-fitting screens on windows and doors; also install door sweeps.
- Seal or caulk cracks and crevices where spiders can enter the house.
- Install yellow or sodium vapor light bulbs outdoors since these attract fewer insects for spiders to feed upon.
- Tape the edges of cardboard boxes to prevent spider entry.
- Use plastic bags (sealed) to store loose items in the garage, basement, and attic.

Sanitation

- Remove trash, old boxes, old clothing, wood piles, rock piles, and other unwanted items.
- Eliminate clutter in closets, basements, attics, garages, and outbuildings.
- Do not stack wood against the house.
- Clean up dead insects that the brown recluse spider can feed on.

Non-chemical control

- Use sticky traps or glueboards to capture spiders.
- Dust and vacuum thoroughly to remove spiders, webs, and egg sacs (dispose of the vacuum bag in a container outdoors).
- Use a rolled up newspaper or fly swatter to kill individual spiders.

Insecticides

There are many labeled pesticides for spider control. Some are labeled for homeowner use, while others are labeled only for the licensed, certified pesticide applicator. It would be prudent to enlist the services of a professional pest management company when dealing with an indoor infestation of the brown recluse spider.

Research indicates that recently developed pyrethroids (e.g., cyfluthrin, cypermethrin, etc.) are particularly effective against brown recluse spiders. Wettable powders and microencapsulated "slow-release" formulations of these chemicals provide residual activity and are preferable to using emulsion-type sprays. Insecticide treatments should be applied so that the chemical contacts as many spiders and webs as possible. Residual liquid sprays should be applied to the outside perimeter of the home (including under eaves, patios, and decks; behind window shutters), baseboards, undisturbed corners, and other suspected spider harborages. Residual dusts should be applied to voids and inaccessible areas where spiders may hide. Aerosol flushing agents such as

pyrethrins, though ineffective by themselves in providing control, can cause spiders to move about so that they contact treated surfaces.

Ants, Bees, Wasps, Hornets, and Yellow Jack

Nests and hives for ants, bees, wasps, hornets, and yellow jackets often occur in ground, trees, and brush. APHIS personnel should be aware of these possibilities and, if a nest or hive is found, workers will avoid activities that might provoke an attack. If a nest or hive must be disturbed in order to accomplish work, appropriate insect sprays will be used to kill the insects before their nest is disturbed and an attack is invited. Bites and stings can be painful and may elicit an allergic reaction. If an individual is known to be allergic to bites and/or stings, that individual must carry an anti-venom kit prescribed by their personal physician. Personnel will be trained in use of the anti-venom kit by the allergic individual. If simple first-aid measures or use of an anti-venom kit does not alleviate the symptoms, the victim will be taken to the nearest medical center. An attempt will be made to kill the offending insect and take it to the emergency room with the victim, if this can be done quickly and without endangering personnel.

- **Hybrid and Africanized Bees**



Current migration – Chart and photograph from ARS website.



Africanized Honey Bee

William F. Lyon
James E. Tew

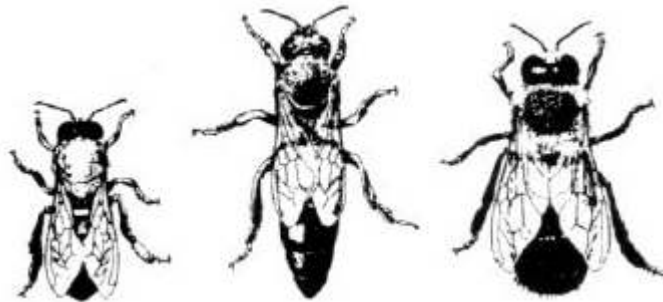
*Ohio State University Extension

The Africanized Honey Bee (AHB) is a result of mating between African bees and European honey bees of North and South America. In 1956, a geneticist brought African queens to Brazil with the idea of developing a superior honey bee, one more suited to tropical conditions. Unfortunately, bees from 26 experimental colonies headed by African queens swarmed near Sao Paulo, Brazil. The bees interbred in the wild with the European honey bees, resulting in "Africanized" offspring. These bees are moving northward about 100 to 300 miles per year. They have spread throughout most of South America, Mexico, southern parts of Texas, New Mexico, Arizona, and California.

Identification

All honey bee colonies are composed of three castes: a queen, several hundred drones, and from 30,000 to 50,000 workers. Because colonies are highly specialized, no individual bee, including the queen, is capable of living alone or establishing a new colony. The worker bee, which flies from flower to flower, is the most familiar of the three castes. It measures about 3/8- to 1/2-inch long.

Although the AHB looks like our European honey bee, it can be differentiated by a laboratory examination and computer analysis. An identification method called FABIS (Fast Africanized Bee Identification System) is currently being used. First, a bee sample is taken and the wings are measured. Results are then compared with standard European bee wing measurements. If the results indicate a probable positive AHB, a complete body part measuring analysis is conducted.



Adult Honey Bees Consist of Castes

Worker 2/5-3/5 in., Queen 3/5-3/4 in., Drone 3/4-5/8 in.

Life Cycle and Habits

Both European and Africanized queens are responsible for reproduction in their colonies. Their drones mate with the queens, while the workers, which are sterile females, collect nectar and pollen and defend the colony.

European and Africanized workers have barbed stingers. When either type of bee stings a human, it leaves both the stinger and tiny, attached venom sac. This causes the bee to die soon after. If you are stung, simply scrape the stinger out to remove it.

The venom of an AHB is no more poisonous than that of their European counterparts. However, they are more defensive if provoked. The stinging response of AHBs is 10 times greater than that of European honey bees. Vibrations from motors, such as a power lawn mower or weed whacker, particularly seem to disturb them. When provoked, the bees will wander as far as a quarter mile from their nest to chase an intruder. However, individual AHBs on foraging trips for nectar and pollen are no more likely to sting than our European honey bees - they are not wanton killers.

Africanized honey bees tend to colonize large areas and swarm excessively. Also, the bees will leave the colony completely and move to a new location when conditions in the environment do not suit them - a special trait known as "absconding." Africanized honey bees may abscond on flights of several miles.

Impact on Pollination and Honey

European honey bees that interbreed with AHBs may become harder to manage as pollinators and may produce less honey. This is an important consideration when each year honey bees add at least \$10 billion to the value of more than 90 crops in this country. They also produce about \$150 million worth of honey each year.

Questions and Answers about AHBs

1. *Are AHBs the same as the "killer bees" of the media news and the movies?*

Yes and no. The two names do refer to the same bee, but the term "killer bee" is a misnomer that Hollywood picked up and made famous. Africanized honey bees are hybrids of African honey bees brought to Brazil in 1956 and honey bees originally brought to the New World by European colonists. Honey bees are not native to the New World. Because of the way AHBs have been portrayed in the movies, some people expect them to go flying around looking for victims to swoop down on, en masse, causing death and destruction. This is not true. In reality, the chances of being killed by honey bees of any sort are less than the chances of being hit by lightning.

2. *How far will AHBs spread into the United States?*

Nobody knows for certain at this time. Some scientists believe AHBs will thrive only in the southern United States where the winters are relatively mild. Others believe that AHBs will survive anywhere other honey bees do. According to studies conducted by researchers with the USDA Agricultural Research Service, the situation is likely to mirror what has taken place in Argentina. A southern zone will develop where feral honey bees are almost completely Africanized and a northern zone will continue to be populated almost completely by our more familiar bees. A transition area will likely exist between these two zones in which the two groups interbreed and their behavior will stretch across the entire range of defensiveness.

3. *Where are the AHBs now?*

As of July 1997, AHBs have spread across much of southern Texas. The AHB is also in the southern parts of New Mexico, Arizona, and California.

4. *How quickly will AHBs spread?*

The speed with which AHBs spread varies from year to year, depending on the weather, terrain, and the available food supply. Under average conditions, AHBs spread from 100 to 300 miles per year. However, in the past three years, AHB movement has been very slow.

5. *What does an AHB look like?*

To the untrained eye, an AHB looks just like any other honey bee, about 3/8- to 1/2-inch long. However, trained specialists can distinguish between AHBs and other honey bees.

6. *Is one sting from an AHB deadly?*

No. One sting from an AHB is no more or less painful or dangerous than a sting from any other honey bee. The venom of the two types of honey bees is almost identical. But AHBs do tend to sting in greater numbers and with less provocation than the honey bees we are used to in the United States.

7. *What makes AHBs and other bees sting?*

Honey bees generally sting when their nests are threatened. On average, AHBs are likely to sting in greater numbers and will pursue intruders further than other honey bees.

8. *How many times can an AHB sting?*

Like all honey bees, an AHB can only sting once. They die shortly after stinging because they leave the stinger in the wound with a tiny venom sac attached.

9. *What should I do if I am stung?*

Above all, stay calm. Remove the stinger if one is present. If anything abnormal happens away from the sting site, seek medical attention.

10. *What should I do if AHBs or other bees start to sting me?*

Get away as quickly and safely as possible. Cover your head with a jacket or sweater and run to get inside the nearest car or house. AHBs have been known to follow victims as much as a quarter of a mile from the nest or hive.

11. *Am I likely to see AHBs once they move into an area?*

If you see honey bees now, you will probably see AHBs once they move into the area. If you don't notice honey bees now, you are not likely to see AHBs. The most common sighting is to see a swarm of bees as they look for a new home, either flying about or resting on a tree branch or railing.

Africanized honey bees are less discriminating than other honey bees when it comes to nesting sites. They will build nests in the ground, in cavities in trees or buildings, under bridges, and in utility boxes if they can find a hole through which to enter. To keep swarms from taking up residence in a building or utility box, seal cracks and holes or cover them with small gauge wire mesh.

12. *Why is the United States Department of Agriculture involved with AHBs?*

Honey bees are a vital link in U.S. agriculture. Many of our crops originated in the Old World and evolved with honey bees as their natural pollinators, so we need to provide them to pollinate these fruits and vegetables now. Domestic honey bees that interbreed with AHBs may become harder to manage as pollinators and may be less effective for producing honey.

13. *What are scientists doing about the AHBs?*

Both USDA and university scientists are studying biology, behavior, and management of the AHBs. Understanding the bee will be important in managing it.